July 7, 2018:

EXECUTIVE SUMMARY

The 416 Fire started on June 1, 2018 approximately 13 miles north of Durango, Colorado. The majority of the fire is on the San Juan National Forest; the cause is unknown. While containment of the 416 Fire is not expected until after the start of the July monsoons, a Burned Area Emergency Response (BAER) assessment was initiated in late June as the monsoons could pose significant threats to values at risk within and downstream of the fire. This initial BAER assessment covers 34,400 acres and identifies risks to public safety and infrastructure prior to the first damaging storm. Since the assessment was initiated the fire size has increased to over 52,000 acres; it is anticipated that there will be a follow-up BAER assessment as the fire nears containment.

Modelling estimates for erosion, flood flows, and debris flow potential represent the lower end of expected watershed response as the burned area continues to expand in the Hermosa Creek watershed. There is also potential for the fire to cross over into other watersheds with values at risk that would warrant future BAER assessment.

This initial BAER assessment is based on available BARC data from June 19, 2018. Of the burned acres assessed, 9% were unburned, 37% were of low burn severity, 47% were moderate burn severity, and 7% were of high burn severity.

Burn Severity By Ownership as of June 19, 2018:

Owner	High	Moderate	Low	Unburned	Total
San Juan NF	2,559	15,807	12,190	3,140	33,696
Private	12	222	377	85	696
Total	2,571	16,029	12,567	3,225	34,392

The USFS is responsible for addressing risks on NFS lands. This report focuses on risks and proposed treatments to address threats to values at risk on NFS lands, but also provides relevant information to help identify potential threats lands downstream of the fire. Proposed treatments focus on inter-agency coordination and information sharing to reduce threats to life/safety and property, storm proofing roads, and minimizing the spread of noxious weeds into burned areas which could detrimentally affect native plant communities.

In total the BAER team identified approximately **$103,538** in potential emergency stabilization treatments to address post-fire threats from the 416 Fire.

Date: July 7, 2018

BURNED-AREA REPORT
(Reference FSH 2509.13)

PART I - TYPE OF REQUEST

A. Type of Report

[X] 1. Funding request for estimated emergency stabilization funds
[ ] 2. Accomplishment Report
[ ] 3. No Treatment Recommendation

B. Type of Action

[X] 1. Initial Request (Best estimate of funds needed to complete eligible stabilization measures)

[ ] 2. Interim Report #____
[ ] Updating the initial funding request based on more accurate site data or design analysis
[ ] Status of accomplishments to date

[ ] 3. Final Report (Following completion of work)

PART II - BURNED-AREA DESCRIPTION

A. Fire Name: 416 Fire

B. Fire Number: CO-SJF-000416

C. State: CO

D. County: La Plata

E. Region: 02

F. Forest: San Juan NF

G. District: Columbine RD

H. Fire Incident Job Code: PNLT5Q (1502)

I. Date Fire Started: June 1, 2018

J. Date Fire Contained: Fire 37% contained as of July 4, 2018

K. Suppression Cost: $28.3 million as of July 4, 2018

L. Fire Suppression Damages Repaired with Suppression Funds
1. Fireline waterbarred (miles):Waterbarring has not occurred as fire is only at 37% containment
2. Fireline seeded (miles): Same as above
3. Other (identify): Safety zones, staging areas and drop points are identified for rehabilitatation following completion of suppression activities.

M. Watershed Number:

Sixth field sub-watersheds and named streams within burned area

5th level watershed	6th level sub-watershed	HUC	Major named streams in the sub-watershed	Total acres	Acres burned	Percent burned
Hermosa Creek	South Fork-Hermosa Creek	140801040404	South Fork Hermosa Creek, Bear Creek	21,556	15,089	70%
	Deer Creek-Hermosa	140801040405	Salt Creek, Elk Creek, Deer Creek,	21,834	2,020	9%

	Creek		Big Lick Creek			
	Dutch Creek-Hermosa	140801040406	Dutch Creek, Little Elk Creek	21,136	3,264	15%
	Buck Creek-Hermosa	140801040407	Clear Creek, Buck Creek	13,935	6,423	46%
Electra Lake-Animas River	Electra Lake-Tank Creek	140801040502	Elbert Creek	16,367	3,183	19%
	Coon Creek-Animas River	140801040503	Coon Creek, Stevens Creek, Animas River	19,446	2,510	13%
	Falls Creek	140801040504	Falls Creek, Animas River	14,864	1,901	13%

The streams within these watersheds are bedrock, cobble, and gravel dominated stream systems. Many of the riparian areas are timbered with cottonwood and/or spruce-fir as well as a willow and alder component. There are 34 miles of "Outstanding Waters" within the Hermosa Creek 5th level watershed. A unique lineage of Colorado cutthroat trout exist in Clear Creek within the Hermosa 5th level watershed.

N. Total Acres Burned:
NFS Acres(**33,392**[1]) Other Federal (0) State (0) Private (696)

O. Vegetation Types: Vegetation in the 416 fire varies by elevation. Lower elevations are a mix of gambel oak and ponderosa pine with some aspen. As elevation increases, aspen becomes more dominant with spruce-fir replacing the oak and ponderosa pine. There are some open grass meadows and shrub hillsides. Approximately 45% of the area assessed is mixed conifer, 25% is aspen of which the majority includes a conifer component, 10 % is mountain shrubland, and 9% is ponderosa pine. The remaining area is a combination of riparian, sage and rock.

P. Dominant Soils: Dominant soil types within the fire perimeter include the Grayskill-Scotch Complex and the Archuleta-Sheek complex. The Graysill series consists of moderately deep, well drained soils that formed in residuum or slope alluvium derived from sandstone and interbedded shale. The Scotch series consists of shallow, well drained soils that formed in slope alluvium and residuum derived from sandstone and interbedded shale. The Archuleta series consists of shallow, well drained soils that formed in residuum or loamy slope alluvium over residuum, derived from interbedded sandstone and shale. The Sheek series consists of very deep, well drained soils that formed in gravelly, cobbly, and stony colluvium and slope alluvium derived from sandstone and shale. Soil structure and fine roots were impacted by fire in high soil burn severity areas. Loss of the litter/duff layer and compromised structural integrity will exacerbate post fire erosion and will inhibit recovery in areas were these effects were most pronounced. Areas that remained unburned and those that experienced low burn severities were found to have a more natural structure (generally granular to subangular) with more organic matter and higher amounts of soil moisture. Recovery of small amount grasses and forbs was observed throughout the burned area and over the range of burn severities. Consumption of heavy surface fuels will likely detrimentally affect soil productivity over small areas but, overall, it is not believed that long term soil productivity will be an impediment to the continued recovery of plants during successive growing seasons. Debris Flows and high rates of erosion are likely within drainages that experienced moderate to high soil burn severity, especially in steep drainages where ground cover consumption was high.

Q. Geologic Types: The geology of the 416 Fire is of the Molas Formation (nonmarine shale, siltstone, sandstone, conglomerate and basal red breccia) and Hermosa Group (dark-gray marine shale, limestone and sandstone), and some Cutler Formation (nonmarine red shale, siltstone, mudstone, and arkosic grit and conglomerate). Much of the area is alluvium and colluvium deposits.

[1] As of June 21, 2018

R. Miles of Stream Channels by Order or Class: 27 miles perennial; 131 miles Intermittent

S. Transportation System

Trail Type	Trail Miles in BARC Fire Perimeter
Non-motorized	9
Wheeled Vehicles <50" width	4
Single-track Motorized	19.5
TOTAL	**32.5**

Roads

System Road	Road Miles in BARC Fire Perimeter
County	0.55
NFS - ML1	1.54
NFS - ML2	2.33
NFS - ML3	2.49
TOTAL NFS	**6.9**

PART III - WATERSHED CONDITION

A. Burn Severity (acres): 3140 ac (9%) (unburned) 12,190 (36%) (low) 15,807 (47%) (moderate) 2559 (8%) (high)

B. Water-Repellent Soil (acres): 5,765 acres

C. Soil Erosion Hazard Rating (acres):
2,467 (no rating) 894 (slight) 1,649 (moderate) 13,810 (severe) 14,876 (very severe)

D. Erosion Potential: 7.5 tons/acre

E. Sediment Potential: 2,357 cubic yards / square mile

Supporting information regarding these estimates is available in the soils specialsit report. The final soil burn severity map is displayed in Appendix A.

PART IV - HYDROLOGIC DESIGN FACTORS

A. Estimated Vegetative Recovery Period, (years): 3-5 years

B. Design Chance of Success, (percent): 80%

C. Equivalent Design Recurrence Interval, (years): 10 year

D. Design Storm Duration, (hours): 1 hour

E. Design Storm Magnitude, (inches): 1.1 inches

F. Design Flow, (cubic feet / second/ square mile): See Table 2 below

G. Estimated Reduction in Infiltration, (percent): 55%-- See Table 1 below

H. Adjusted Design Flow, (cfs per square mile): See Table 2 below

Table 1: Soil burn severity and percent of watershed in each severity class by modeled drainage

Modeled drainage	Unburned acres	UB %	Low acres	Low %	Moderate acres	Mod %	High acres	High %
Bell Canyon	35	8	129	31	228	54	29	7
Clear Creek	3,916	63	1,064	17	1,110	18	92	2
Dyke Canyon	<1	0	60	21	189	65	41	14
Glacier Club	12,535	88	833	6	804	6	54	<1
Hermosa Creek	84,402	77	9,461	9	12,505	12	2,143	2
South Fork Falls Creek	18	3	161	28	329	57	70	12
Tripp Gulch	231	16	388	27	660	46	144	10

Table 2: Pre and post-fire peak flow predictions from AGWA Model

Modeled Watershed	Percent NFS land	10-year, 1-hour event					
		Pre-fire estimated discharge (cfs)	Post-fire estimated discharge (cfs)	Relative percent increase	Bulked post-fire estimated discharge (cfs)	Relative percent increase	Post-fire time to peak (minutes)
Hermosa Creek-Animas River Confluence	99%	11	184	1,567	230	2,091	121
Bell Canyon	97%	5	41	741	51	920	37
Clear Creek	99%	Data forthcoming					
Dyke Canyon	100%	0.2	5	2,802	6	3,125	29
Glacier Club	62%	28	29	0	36	129	94
Falls Creek Tributary (south)	97%	22	45	108	56	154	25
Tripp Gulch	92%	51	178	251	223	436	39

Additional information pertaining to the hydrology modeling is available in the hydrology specialist report.

PART V - SUMMARY OF ANALYSIS

A. **Describe Critical Values/Resources and Threats**: Threats to critical values and determination of risk was based on the following matrix from FSH 2523.

BAER Risk Assessment

Probability of Damage or Loss	Magnitude of Consequences		
	Major	Moderate	Minor
	RISK		
Very Likely	Very High	Very High	Low
Likely	Very High	High	Low
Possible	High	Intermediate	Low
Unlikely	Intermediate	Low	Very Low

Probability of Damage or Loss: The following descriptions provide a framework to estimate the relative probability that damage or loss would occur within 1 to 3 years (depending on the resource):

- Very likely. Nearly certain occurrence (90% - 100%))
- Likely. Likely occurrence (50% - 89%)
- Possible. Possible occurrence (10% - 49%)
- Unlikely. Unlikely occurrence (0% - 9%)

Magnitude of Consequences:

- Major. Loss of life or injury to humans; substantial property damage; irreversible damage to critical natural or cultural resources.
- Moderate. Injury or illness to humans; moderate property damage; damage to critical natural or cultural resources resulting in considerable or long term effects.
- Minor. Property damage is limited in economic value and/or to few investments; damage to critical natural or cultural resources resulting in minimal, recoverable or localized effects.

Critical Value: Human life/safety

Threats to life, safety, and property exist in steep moderate and high soil burn severity areas throughout and downsream from the burned area. Forest users will be exposed to significantly increased risk of flooding and debris flows, as well as hazard trees.

Debris Flow Hazard:
The debris flow hazard is expected to increase significantly in the years following the fire. There are concerns as there are a high number residents and recreationists in the area resulting in high numbers of people exposed. The greatest concern is in the southern portion in the vicinity of Tripp Gulch and Dyke Canyon. In addition, the infrastructure in the area in not adequate to handle the increases in flow and sediment predicted.

Debris across the roads, particularly the Lower Hermosa Creek road, could result in loss of life and damage a level 3 road.

Hazard Trees: The number of hazard trees has signficantly increased from fire weakened trees. Forest users are at greater risk of injury from hazard trees following the fire.

The burned area is popular with recreationists, particularly in the Hermosa Creek drainage which sees tens of thousands of visitors each year; the high visitation results in a higher threat to human life and safety from hazard trees as well as direct and indirect efffects of flooding and debris flows.

Emergency Determination: The probability of loss is Very Likely and the magnitude of consequence is Moderate for threats to life/safety on Forest Service lands; **the BAER risk is Very High.**

Critical Value: Property

Roads

There are 6.9 total miles of NFS Roads within the burn perimeter. Roads within the burned area are at risk from impacts from increased water, sediment, and/or debris. Impacts include damage to the road and/or loss of access due to severe erosion of the road surface, or deposition of sediment or debris. Roads within the burned area are also likely to exacerbate the risk of flooding and erosion by collecting surface water, concentrating it and delivering it to hillslopes or stream channels. Most of the roads within the burned area have inadequate cross-drainage for anticipated post wildfire flows.

The Lower Hermosa Creek road is a maintenance level 3 that provides access to the Hermosa Creek Campground, trailhead, and multiple trails. Tens of thousands of visitors come to this area each year for recreation. Users include mountain bikers, hikers, horseback riders, and horses (personnel communication with Columbine District Ranger). This road provides key access for the public and adminstrative use within the burned area.

Emergency Determination: An emergency for roads was determined for Human Life and Safety and Property. The probability of loss is Likely and the magnitude of consequence is Moderate. **The BAER risk is High.**

NFS Recreation infrastructure

Within the fire perimeter there are 32.5 miles of trail of which12 miles were identified as being burned over by fire of Moderate to High Severity. Values at risk include the trail tread, water quality, and fish habitat. It is anticipated that increase in flows associated with the fire effects will cause trail rilling and erosion, trail approaches to stream crossings on steep slopes are at risk of failure, and cut slope and fill slope failures are likely to occur. In addition to the resource degradation, the trails are likely to become difficult or dangerous for travel.

Facilities at risk include the Lower Hermosa Campground and Trailhead. These facilities were determined to be at low risk of post-fire threats due to low burn severity around and upslope. As stated above, recreation in the Hermosa Creek drainage where the majority of the affected trails are draws tens of thousands of visitors each year.

Emergency Determination: An emergency for recreation (trails) was determined for Human Life and Safety and Property. The probability of loss is Likely and the magnitude of consequence is Moderate; **the BAER risk is High.**

Spring Developments:

17 Forest Service spring developments exist within the burn perimeter. Nine spring developments were identifed as at high risk for post-fire effects due to upslope of high and moderate soil burn severity upslope. As of this assessment, the threat has not been validated due to fire suppression limiting access. These developments will be evaluated in the future and at which time an emergency determination will be made.

Emergency Determination: This assessment did not determine an emergency for spring developments at this time as no field assessment was conducted due to suppression activities. Field evaluation at a later time may result in an emergency determination

Critical Value: Natural Resources

Soil productivity: While wildfire will have a negative effect on soil productivity and vegetative recovery, over time it is expected that natural processes will result in the most effective revegetation of these soils. While soil loss may be greater in localized patches, these impacts are not considered significant and will not result in permanent impairment of soil productivity in the long-term (10 years).

Emergency Determination: The probability of loss is possible and the magnitude of consequence is minor; the risk is low. Therefore, no BAER emergency exists

Water Quality:
The cumulative effect of increased peak flows and sediment laden flows from the burned areas increases the risk for water quality on the Forest and various downstream values at risk, particularly effects on drinking and irrigation water providers.

Soil erosion and subsequent large sediment increases are predicted throughout and downstream of the burn area. An effort to inform water users about water quality degradation the following has been initiated since large sediment increases are expected from erosion (including ash) and debris flows. These increases will be of short term duration, recovering to pre-fire conditions over time with the worst impacts occurring over the next three years. During this time there is likely potential for degradation of source water quality for water developments downstream of moderate to high severity burn areas.

Emergency Determination: The probability of loss is Very Likely and the magnitude of consequence is Minor on NFS lands. The risk is low; therefore no BAER emergency exists on NFS lands. Municipal surface water developments are all located off NFS lands, therefore no BAER assessment was made.

Native or Naturalized Plant Communities

The fire area was under management for noxious weed infestations prior to the fire. Houndstongue (Cynoglossum officinale), Musk Thistle (Carduus nutans), Bull Thistle (Cirsium vulgare), and Canada Thistle (Cirsium arvense) are known to occur within the burn area and along adjacent access routes to the burn. Several plant vectors such as Forest roads, trails, areas impacted by fire suppression, high winds, and waterways occur within the fire area. Even though a weed washing station was utilized, seed could have been transported into the burn on suppression vehicles and equipment that arrived on the fire before the washing station was established. Fire is known to enhance the establishment of all weed species present.

The spread of noxious weeds would adversely affect multiple resources including native plant communities which in turn affects threatened and endangered species habitat for wildlife and fisheries. Forest Service policy mandates the Forest to minimize the establishment of non-native invasive species to prevent unacceptable degradation of the burned area.

Emergency Determination: An emergency for native plant communities from invasion of noxious weeds was determined exists. The probability of loss is Very Likely and the magnitude of consequence is Moderate; the BAER risk is High.

Wildlife: Critical TES Habitat or Suitable Occupied Habitat

Habitat for two federally listed species exists within the fire perimeter: Canada lynx (*Lynx canadensis*) and Mexican spotted owl (*Strix occidentalis lucida*). No critical habitat is present for any federally listed species.

Canada Lynx

Based on the burn severity type in Canada lynx habitat the 416 fire will likely create a mosaic of successional stages that will be beneficial for providing foraging and denning habitat for Canada lynx (Ulev 2007). However, short term effects may be negative in some areas due to a reduction in cover and temporary effects to prey species. It is expected that as succession progresses, the amount of vegetation will increase providing the necessary cover and forage for snowshoe hares, resulting in greater abundance of hares. Fire may have negative impacts on Canada lynx and snowshoe hare in the short term due to reduced food and cover (Koehler and Brittell 1990; Parker et al. 1983). However, as succession continues, the amount of food and cover for snowshoe hares will increase, resulting in greater abundance of hares and thus a potential increase in densities of Canada lynx. Overall, the lynx habitat within the BARC perimeter is at a low of risk due to the mosaic nature of the fire and the small amount of habitat that experienced high intensity fire.

Mexican spotted owl

Overall, the Mexican spotted owl habitat within the BARC perimeter is at a low of risk due to the mosaic nature of the fire. Though over 6,000 acres of Mexican spotted owl habitat burned at either moderate or high severity, there is abundant habitat for this species outside the perimeter of the burn and given the negative survey results on the forest, it is unlikely this species occurs on the SJNF. In addition, while the moderately burned areas may temporarily become less suitable for the species, the effects may enhance habitat by enhancing habitat components for this species and reducing the chance for future stand replacing fires.

Multiple Forest Service sensitive species occupy the burn area. While the fire affected some habitat for the majority of the species, the mosaic nature of the burn is not expected to significantly affect these populations.

Emergency Determination –The probability is Unlikely and the consequences are moderate; the risk is Low; no emergency exists pertaining to the federally listed or Forest Service Sensitive species or their habitats.

Fisheries: Critical TES Habitat or Suitable Occupied Habitat

San Juan lineage cutthroat trout

A unique lineage of cutthroat trout was recently confirmed to be present on the Forest. The San Juan lineage of Colorado River cutthroat trout (SJCT) was previously thought to be extinct, until genetic testing confirmed its presence. While not federally-listed, this lineage is known from only seven populations in Colorado, all located on the San Juan National Forest or adjacent private lands. Due to its conservation significance and rarity, and Colorado River cutthroat trout status as a Forest Service Sensitive Species, we are including SJCT in our analysis as loss of any population of this lineage would be a significant impact to long-term conservation. Habitat for SJCT is present in Clear Creek and Big Bend Creek in the Hermosa Creek Wilderness. Clear Creek is located within the 19 June BARC map and is included in this analysis, whereas the fire had not yet reached Big Bend Creek when the BARC map was produced. However, subsequently the fire has moved into Big Bend Creek and potential effects to SJCT from the effects of fire activity will be evaluated after containment and during a follow-up BAER analysis.

The BARC map created on 19 June 2018 showed predominately low level intensity and unburned patches within the Clear Creek watershed where SJCT are known to occur. More moderate burning occurred on some slopes above the stream with a few small patches of high intensity burning.

Due to burnout operations in the headwaters of Clear Creek during flight reconnaissance for the BAER analysis, it was not possible to fly over Clear Creek to better determine and validate burn intensity in the drainage. However, it is expected that the BARC map accurately represents fire intensity in this area.

Increased sedimentation can result in the loss of habitat for both aquatic macroinvertebrates and fish, because interstitial spaces in the streambed can be eliminated and pools may be filled. Sediment may also impact fish and aquatic invertebrates through clogging of the gills or smothering and indirectly affect them by reducing spawning and resting habitat (Waters, 1995).

The removal of riparian vegetation can increase stream water temperatures by removing shading. Stream temperature regulates metabolism in fish and elevating temperatures can cause changes in growth, survival, and reproductive success (Bell, 2006).

SJCT habitat within the Clear Creek drainage is at moderate risk. This determination was made because it is possible that there will be adverse effects to SJCT habitat from post-fire sedimentation and ash flow. It was determined the probability is unlikely due to the unburned and low intensity burned areas within the riparian corridor and partially upslope from the stream that will serve as a buffer to intercept sediment and ash. However, should significant impacts occur to the stream, the magnitude of consequences would be moderate due to the rarity of this lineage of cutthroat trout and its conservation value.

Emergency Determination - This assessment did not determination an emergency for fisheries, however the fact that the fire continues to spread in watershed containing the San Juan lineage of fish an emergency determination may be made at a later time

CULTURAL AND HERITAGE RESOURCES

Twenty-one (21) recorded cultural resource sites are located within the 416 fire perimeter. Of these 21 sites, 5 were previously determined "eligible" or remain unevaluated for eligibility to be listed on the National Register of Historic Places. Due to ongoing fire and suppression activities, one site (5LP7595), a multi-component prehistoric camp and historic ranching outpost, was field-reviewed to identify risk(s) from erosion, watershed failure, flooding, debris flow, and hazard tree fall. No potential risks to the site were observed and no emergency stabilization treatments are recommended.

Emergency Determination –No emergency exists pertaining to cultural resources. Cultural resource surveys for road treatments will be needed to ensure compliance with the National Historic Preservation Act.

Summary of BAER Risk Assesment

Resource	Critical Value	Probability of Loss	Magnitude of Consequences	BAER Risk
Life/safety	Life/Safety	Very Likely	Moderate	Very High
Roads	Property	Likely	Moderate	High
Trails	Property	Likely	Moderate	High
Spring Developments	Property	Unknown	Unknown	Unknown
Native Plant Communities	Natural Resources	Very Likely	Moderate	Very High
Soil Productivity	Natural Resources	Possible	Minor	Low
Water Quality	Natural Resources	Very Likely	Minor	Low
Wildlife	Natural Resources	Unlikely	Moderate	Low
Fisheries	Natural Resources	Possible	Moderate	Intermediate
Cultural Resources	Cultural Resources	Possible	Minor	Very Low

B. Emergency Treatment Objectives: The proposed treatments on National Forest System lands can help to reduce the impacts of the fire from storm events, but treatments cannot fully mitigate the post-fire effects of the fire. Detailed information of the treatments summarized below can be found in the specialist reports prepared in support of this funding request. The treatments listed below are those that are considered to be the most effective on National Forest System lands to minimize threats to identified values at risk.

Proposed Land Treatments
The objective of the land treatments are to:

1. Promote and protect native and naturalized vegetative recovery by reducing the spread of noxious weeds (L1).

Proposed Road and Trail Treatments
The objective of the road and trail treatments are to:

1. Protect road and trail investments from becoming impassible and damaged due to increased post-fire runoff. (R1, R2, T1)
2. Reduce sedimentation into streams degrading water quality (R1, R2, T1)
3. Improve road drainage by increasing ditch and catchment basin capacity to reduce the potential for road failure due to increased flows (R1, R2)

Proposed Protection/Safety Treatments:
The objective of the protection/safety treatments are to:

1. Protect human life and safety by raising awareness through posting hazard warning signs at recreation sites, trailheads, and when entering the burn area. (P1)
2. Protect life/safety through an area closure. Limiting public access to the burn area wouidl minimize the potential for loss of life or injury from floods, debris flows, and hazard trees (R1)

Proposed Channel Treatments: There are no proposed channel treatments.

C. Probability of Completing Treatment Prior to Damaging Storm or Event:

Land **NA (weeds)** % Channel **NA- none proposed** % Roads/Trails **75** % Protection/Safety **85** %

D. Probability of Treatment Success

	Years after Treatment		
	1	3	5
Land	70	75	80
Channel	NA	NA	NA
Roads/Trails	80	90	90
Protection/Safety	85	90	95

E. Cost of No-Action (Including Loss): $220,000—cost only reflects monetary loss, it does not reflect loss of life or native plant communities

F. Cost of Selected Alternative (Including Loss): $103,538.

Extensive repair or reconstruction of roads and at increased risk of post-fire effects is estimated to be $220,000 per the San Juan Forest Engineer. There is a threat to life and safety as well as natural resources that have non-monetary value. The VAR tool was used to assess the cost benefit of implementing the treatments, and

indicated that treatments were justified with a ratio of 1.2. The VARTool Calculation Spreadsheet is available in the project file. As described in this report, increased risk for impacts to life/safety and non- ecological values exists throughout the burned area. These values were not addressed in the VAR Assessment nor considered in the benefit/cost ratio.

G. Skills Represented on Burned-Area Survey Team:

[X] Hydrology	[X] Soils	[ ] Geology	[X] Range	[ ]
[ ] Forestry	[X] Wildlife	[ ] Fire Mgmt.	[X] Engineering	[ ]
[ ] Contracting	[ ] Ecology	[ ] Botany	[X] Archaeology	[ ]
[X] Fisheries	[ ] Research	[ ] Landscape Arch	[X] GIS	

Team Leader: Liz Schnackenberg; lschnackenberg@fs.fed.us; 970.819.2900

Team members:

Beth Anderson—Soils
Shauna Jensen—Hydrology
Scott Sheppard- Hydrology
Allen McCaw—Engineering
Lynn Robinson—Archaeology (T)
Mark Roper-- GIS
Mary Hammer—Fish/widllife
Lindsey Hansen—Weeds/range
Lindsey Smith-- Archaeology

H. **Treatment Narrative:**

(Describe the emergency treatments, where and how they will be applied, and what they are intended to do. This information helps to determine qualifying treatments for the appropriate funding authorities. For seeding treatments, include species, application rates and species selection rationale.)

Land Treatments:

L1 - Invasive Weed Detection and Treatment: Invasive plant detection and treatment along the Forest Service trails and drainages, that were of high to moderate burn severity and where non-native invasive plants are absent or present in small amounts, will be necessary to prevent spread and dispersal of non-native invasive plants into newly burned and disturbed areas. Although moderate burned areas may have some intact vegetation or may experience needle fall, it is not sufficient to prohibit the spread and establishment of invasive plants. The focus will be on locations adjacent to known weed sites, where fire suppression may have introduced invasive plants and road systems that have been previously disturbed and will have a greater potential for invasive plants to establish. The road and trail systems are primary vectors for weed spread and Early Detection/Rapid Response (EDRR) will allow treatments to occur before these species are able to spread. An estimated 192 acres will be surveyed.

Road and Trail Treatments:

R1 – Storm Proofing and road stablization: Storm proof drainage features where identified to protect the ML3 road investment. Activity will include cleaning culverts Inlets, road ditches, and ensuring water does not concentrate on the road.

TR1- Storm Patrol: Storm inspection/response will keep road culverts and trail drainage features functional by cleaning sediment and debris from in and around features between or during storms. This work will be accomplished through Forest Service Road Crew, equipment rental, and Forest recreation personnel.

T1- Trail Stabilization - Work will include the installation of drainage features (outsloping, rolling grade dips, water bars), stabilization of two drainage crossings, and snagging trees as appropriate for worker safety. This work is necessary to protect the trail asset by diverting anticipated increases in surface runoff off the trail.

Protection/Safety Treatments:

P1/R1 – Road Hazard Warning Signs and Gates

This treatment will design and install burned area warning signs to caution forest visitors recreating and administrative users about the potential hazards that exist within the burned area. It is consistent with the language provided in the BAER Treatments Catalog. This treatment will place closure signs, hazard warning signs and information signs at key entry points or trail junctions, and numerous recreation trailheads. It will inform users of the dangers associated with entering/recreating within a burned area as well as inform them of closures to help ensure that users are able to access available routes in a safe manner.The warning signs will identify the types of hazards to watch for at roads, trails, and campgrounds.

Installation of gates at two key road entry points, and the purchase and installation of signs at each of the identified locations consistent with Forest Engineering Standards at these locations. A Forest Service employee will inspect the signs for visibility, damage, or loss and replace as needed. This treatment will keep Forest users out of the burn area during major storm events and inform users of the dangers associated with entering/driving within a burned area.

Treatments considered, but not carried forward at this time

San Juan lineage cutthroat trout: Threats exist to the San Juan lineage cutthroat trout from increased sedimentation and debris flows in the two subwatersheds where this species exists. At the time of this assessment the threat was considered low; however the fire has continued to burn into these two subwatersheds which could elevate the threat to a level warranting treatment. This threat will be assessed in future follow-up BAER assessmet.

Spring developments: Nine spring developments were identified as at risk from post-fire threats, but not enough information is available at this time to determine the risk. Future assessment may determine a risk that warrants treatment.

I. **Monitoring Narrative:**

(Describe the monitoring needs, what treatments will be monitored, how they will be monitored, and when monitoring will occur. A detailed monitoring plan must be submitted as a separate document to the Regional BAER coordinator.)

Storm patrol will monitor the effectiveness of road and trail treatments and identify additional maintenance needs. EDRR will monitor weed establlishment and identify if additional treatment is warranted within the first year.

Part VI – Emergency Stabilization Treatments and Source of Funds

Interim #

A. Land Treatments										
EDRR	Acres	34.69	192	$6,660	$0		$0		$0	$6,660
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Land Treatments				$6,660	$0		$0		$0	$6,660
B. Channel Treatments										
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Channel Treat.				$0	$0		$0		$0	$0
C. Road and Trails										
R1-Culvert cleaning	each	350	24	$8,400	$0		$0		$0	$8,400
R1Ditch cleaning/rd te	miles	4	2000	$8,000	$0		$0		$0	$8,000
R1Mobilization	each	7965	1	$7,965						
R1Armor fill slopes	Cyd	210	26	$5,460						
R1/T1Contract officer	Days	450	13	$5,850						
T1Template stabilizati	each	2000	2	$4,000						
T1Waterbars	each	67	125	$8,375						
T1Closure signs	each	8	300	$2,400						
T1armoured xing	each	5000	2	$10,000						
Cultural resource clear	Days	390	3	$1,170						
TR1-Storm patrol equi	Days	900	3	$2,700						
T1R-Storm Patrol	Days	288	20	$5,760						
Contract prep/admin	Days	390	33	$12,870	$0		$0		$0	$5,460
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Road & Trails				$82,950	$0		$0		$0	$21,860
D. Protection/Safety										
R1-Rd closure gate	each	5000	2	$10,000	$0		$0		$0	$10,000
P1Safety signs	each	300	8	$2,400	$0		$0		$0	$2,400
p1 install mileage	each	0.55	250	$138						
P1Installation	Days	140	10	$1,400	$0		$0		$0	$1,400
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Structures				$13,938	$0		$0		$0	$13,800
E. BAER Evaluation										
				---	$35,600		$0		$0	$35,600
Insert new items above this line!				---	$0		$0		$0	$0
Subtotal Evaluation				---	$35,600		$0		$0	$35,600
F. Monitoring										
Insert new items above this line!				$0	$0		$0		$0	$0
Subtotal Monitoring				$0	$0		$0		$0	$0
G. Totals				$103,548	$35,600		**$0**		**$0**	**$77,920**
Previously approved										

PART VII - APPROVALS

1. Forest Supervisor (signature) — Date: 7/09/2018

2. Regional Forester (signature) — Date: 7/23/18

Appendix A: Maps

Figure 1: Final Soil Burn Severity Map

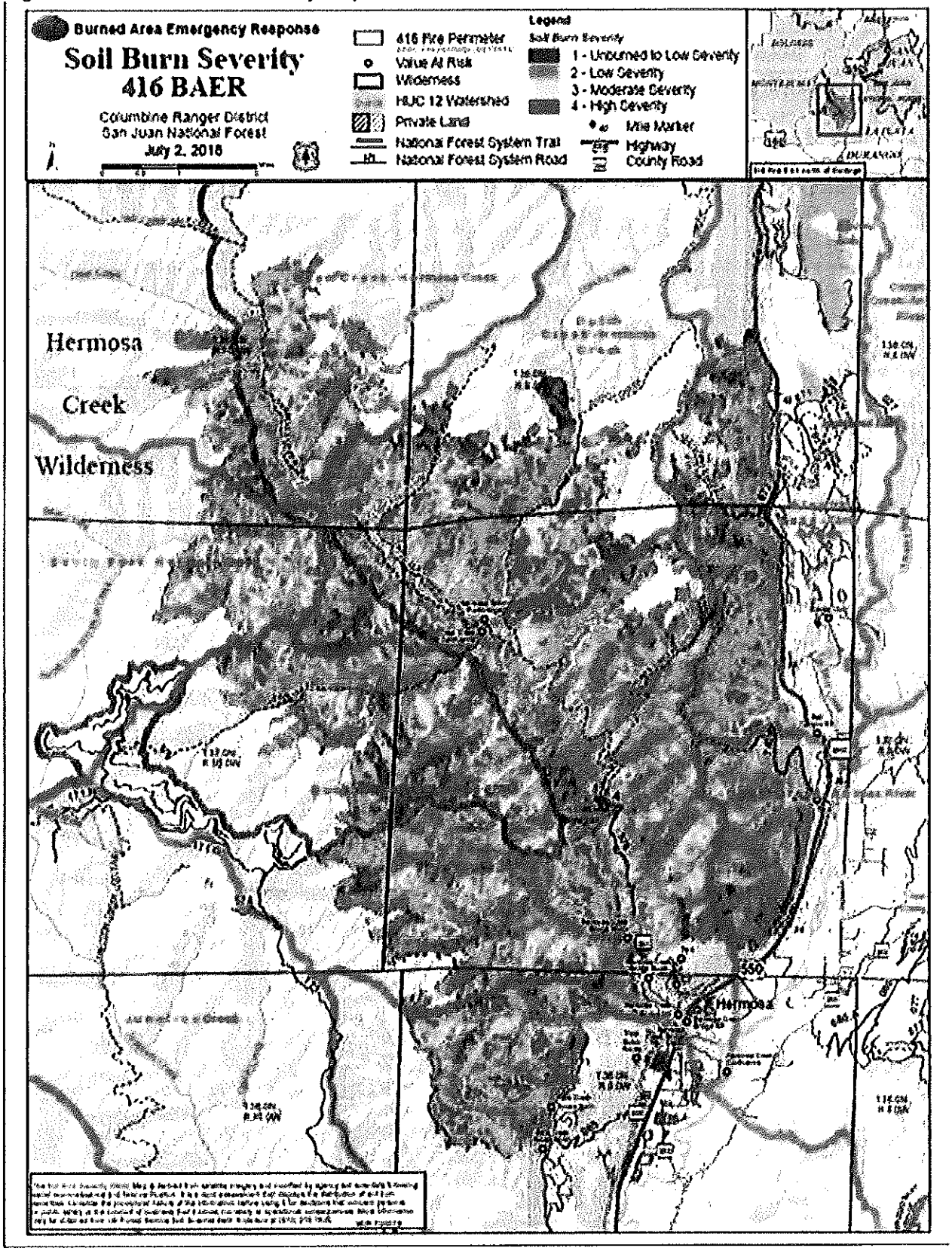

Figure 2: Relative increases in post-fire summer thunderstorm flood flows.

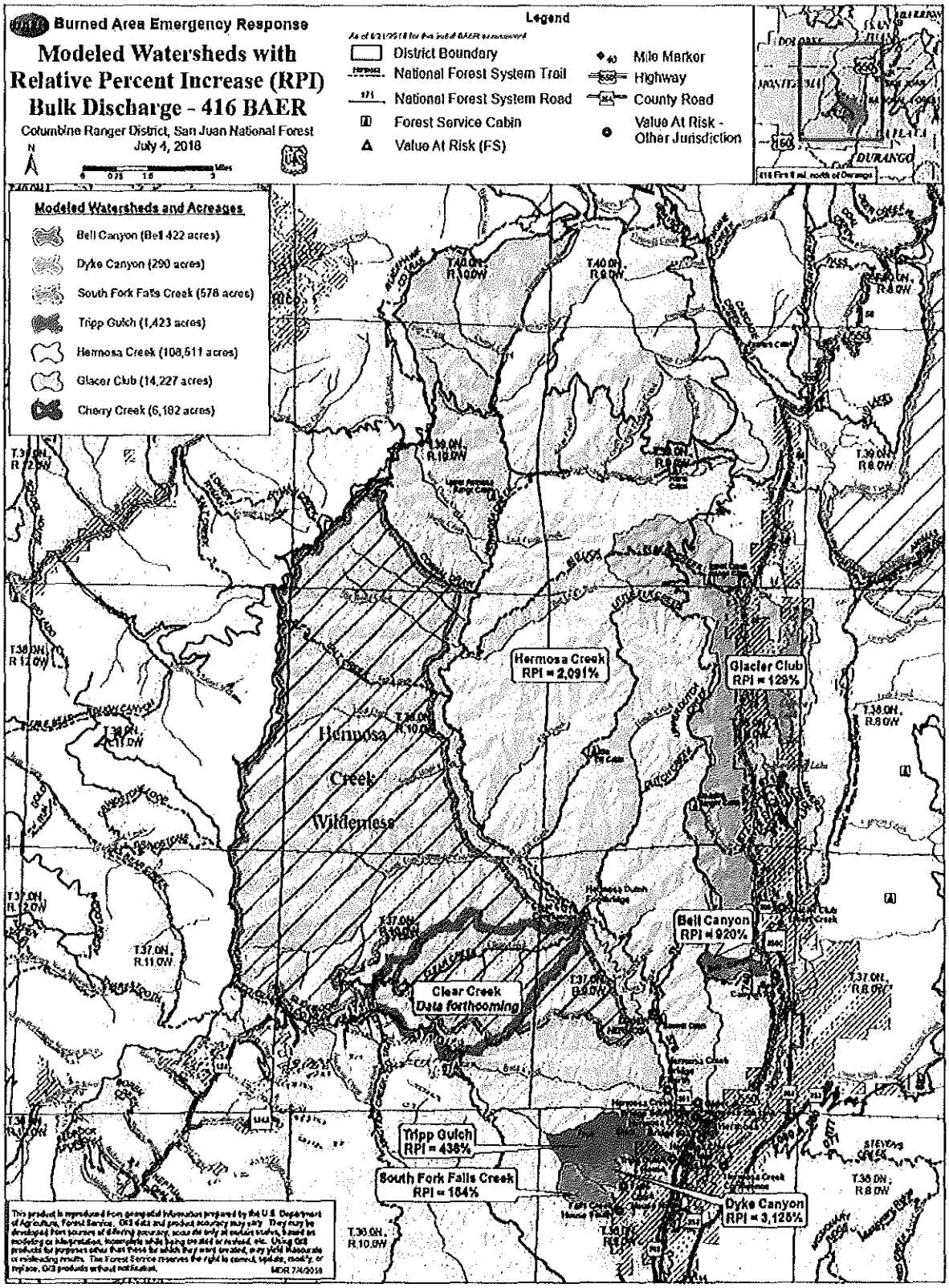
Burned Area Emergency Response
Modeled Watersheds with Relative Percent Increase (RPI) Bulk Discharge - 416 BAER
Columbine Ranger District, San Juan National Forest
July 4, 2018
Legend
District Boundary
National Forest System Trail
National Forest System Road
Forest Service Cabin
Value At Risk (FS)
Mile Marker
Highway
County Road
Value At Risk - Other Jurisdiction
Modeled Watersheds and Acreages
Bell Canyon (Bell 422 acres)
Dyke Canyon (290 acres)
South Fork Falls Creek (578 acres)
Tripp Gulch (1,423 acres)
Hermosa Creek (108,511 acres)
Glacier Club (14,227 acres)
Cherry Creek (6,182 acres)
Hermosa Creek RPI = 2,091%
Glacier Club RPI = 129%
Bell Canyon RPI = 920%
Clear Creek Data forthcoming
Tripp Gulch RPI = 436%
South Fork Falls Creek RPI = 164%
Dyke Canyon RPI = 3,125%
Hermosa Creek Wilderness
DURANGO

Figure 3: USGS Combined Hazard for Debris Flow Potential

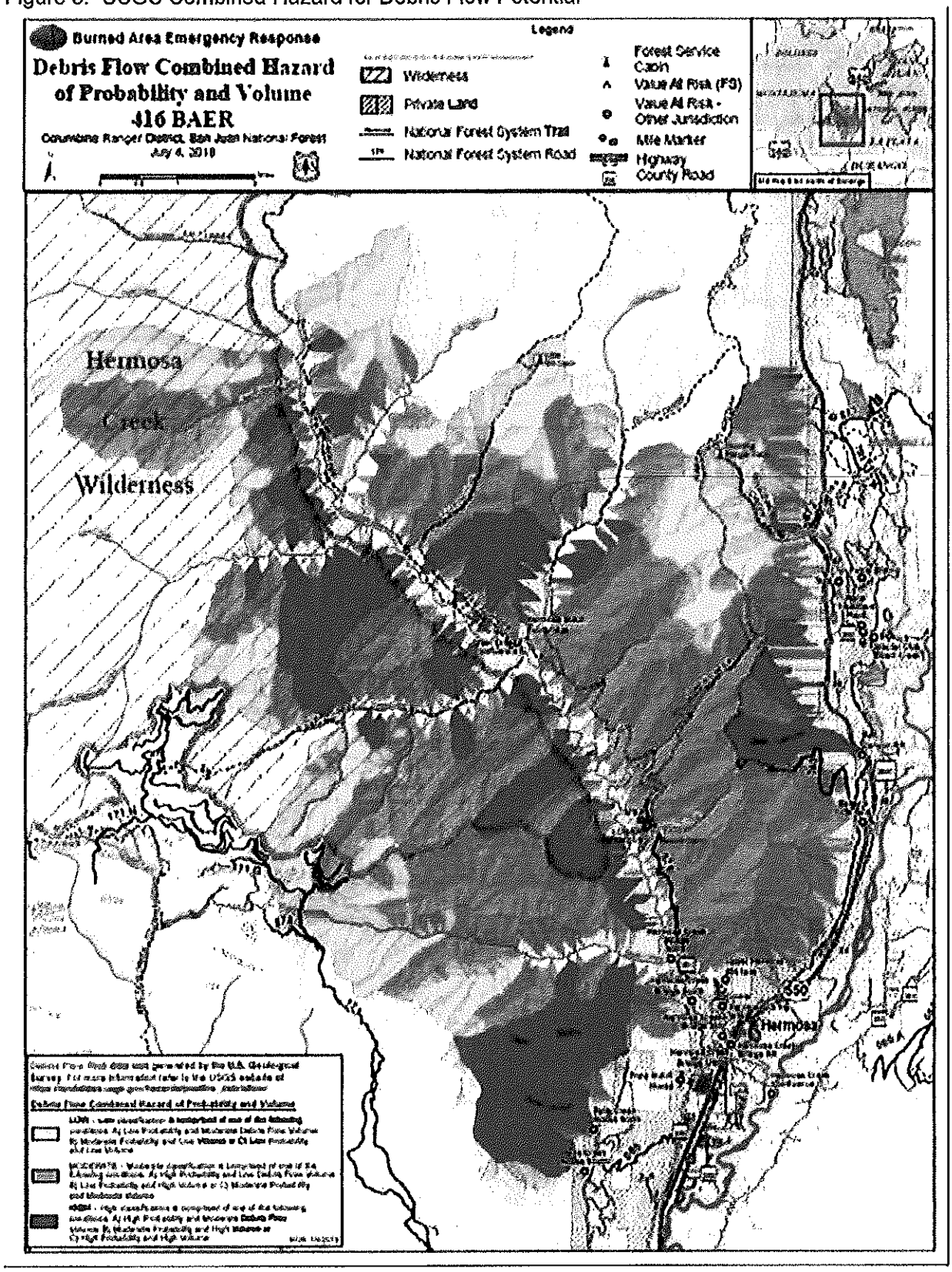

Figure 4: Road and Trail treatments

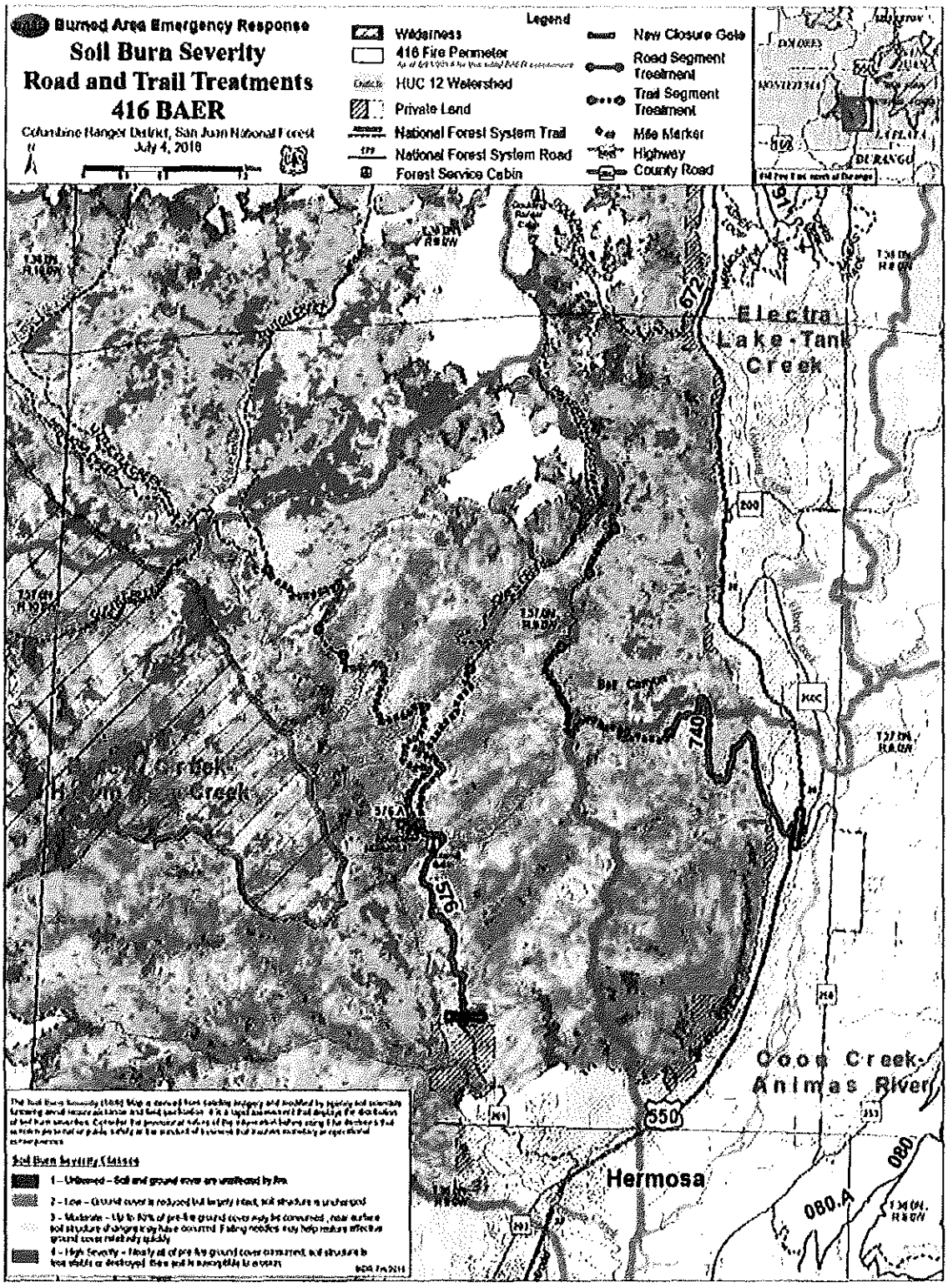
Burned Area Emergency Response
Soil Burn Severity
Road and Trail Treatments
416 BAER
Columbine Ranger District, San Juan National Forest
July 4, 2016
Legend
Wilderness
416 Fire Perimeter
HUC 12 Watershed
Private Land
National Forest System Trail
National Forest System Road
Forest Service Cabin
New Closure Gate
Road Segment Treatment
Trail Segment Treatment
Mile Marker
Highway
County Road
DURANGO
Electra Lake - Tank Creek
Hermosa
Ooos Creek - Animas River
Soil Burn Severity Classes
1 - Unburned - Soil and ground cover are unaffected by fire.
4 - High Severity - Nearly all of pre-fire ground cover consumed, and structure is less visible or destroyed. Water repellency is severe.

Figure 5: EDRR Survey Areas